

Link Interface Specification for the Nova Front End Module to Data Concentrator Module Connection

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Introduction

This specification defines the cables, connectors, pinouts, and electrical requirements for the Nova Front-End Module to Data Concentrator Module (DCM) data links. To reduce cost and simplify specification and acquisition of the data link cabling, Category 5 (CAT5) cables with RJ-45 plugs will be used. On the modules, mating RJ-45 jacks will be used.

Cables and Connectors

CAT5 cables with RJ-45 plugs are to be wired in a straight-through T568A or T568B configuration (Ref: ANSI/TIA/EIA-568.B). Plugs can be connected in either T568A or B configuration, but the same configuration must be used on both ends of the cable.

Cables, plugs, and jacks meeting the ANSI/TIA/EIA-568.B series of specifications are acceptable. Note that since most cables of this type are used for 10/100 Ethernet, it may be possible to find cables with only two pairs of wires connected. For Nova, it must be ensured that all four pairs of wires are connected as specified. CAT5e and CAT6 cables can also be used, but are generally more expensive due to their higher specified bandwidth.

CAT5 cables contain four twisted-pairs of wires with no shield. T568A termination of the four pairs of wires specifies that an RJ-45 plug is connected as shown in Figure 1. T568B termination of cables is similar, but the green and orange pairs are swapped with each other at the plug connection as shown in Figure 2. Either T568A termination or T568B termination can be used, but plugs must use the same termination specification at *both ends of the cable*.

<i>Pair</i>	<i>Wire Pairs(pin number and color)</i>
1	4 (- blue) and 5 (+ white/blue)
2	3 (+ white/orange) and 6 (- orange)
3	1 (+ White/green) and 2 (- green)
4	7 (+white/brown) and 8 (- brown)

Figure 1 CAT5 Twisted Pairs as Wired in T568A Configuration

<i>Pair</i>	<i>Wire Pairs(pin number and color)</i>
1	4 (- blue) and 5 (+ white/blue)
2	1 (+ white/orange and 2 (- orange)
3	3 (+ White/green) and 6 (- green)
4	7 (+white/brown) and 8 (- brown)

Figure 2 CAT5 Twisted Pairs as Wired in T568B Configuration

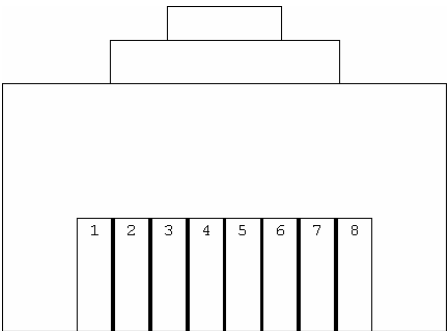


Figure 3 View Looking at Face of RJ-45 Plug

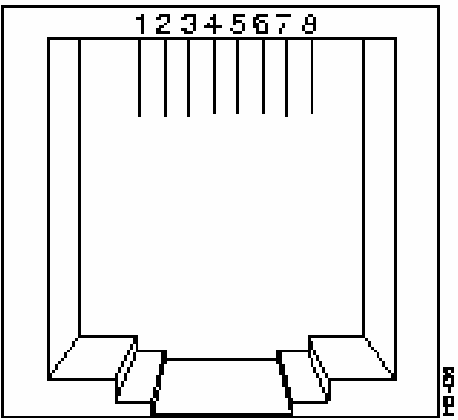


Figure 4 View Looking Into RJ-45 Jack

Proposed Pinout of RJ-45 Connector at Data Concentrator Module

The data link jack on the Data Concentrator Module is defined in Figure 5.

<i>Pin</i>	<i>Function</i>
1	Transmit Sync +
2	Transmit Sync –
3	Receive Data +
4	Transmit Clock -
5	Transmit Clock +
6	Receive Data -
7	Transmit Command +
8	Transmit Command -

Figure 5 Data Link Pinout at DCM

Proposed Pinout of RJ-45 Connector at Front End Module

The data link jack on the Front End Module is defined in Figure 6.

<i>Pin</i>	<i>Function</i>
1	Receive Sync +
2	Receive Sync -
3	Transmit Data +
4	Receive Clock -
5	Receive Clock +
6	Transmit Data -
7	Receive Command +
8	Receive Command -

Figure 6 Data Link Pinout at FEM

Electrical

Each of the four differential pairs on the data link is defined as conforming to the Low-Voltage Differential Signaling (LVDS) standard. No termination is required at the driver, but a 100 ohm differential termination is required at the receiver. 100 ohm differential impedance control should be enforced on all circuit board traces, connectors, and cables.

Since the Front-End modules and the DCM are reference grounded at the same point, and the voltage drop in the Front-End power cables is specified to be small (<100mV), AC coupling of the LVDS pairs is unnecessary. DC coupling simplifies the design of both the Front-End Modules and the DCM's, since ensuring a DC balanced signal is not required. This removes the requirement for 8b-10b or Manchester type encoding of the data.

References

ANSI/TIA/EIA-568-B.1-2001, Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements.

ANSI/TIA/EIA-568-B.2-2001, Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted Pair Cabling Components.

ANSI/TIA/EIA-644-A-2001, Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits.